

## PSYCHOSOCIAL CORRELATES OF OVERWEIGHT AND OBESITY IN INFANCY

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### Abstract

Obesity is a complex disease with not only physical consequences but also psychological. The aim of the present work was to analyze differences between community children with normal weight versus community overweight children versus children with overweight in clinical setting, at the level of quality of life, psychological morbidity and self-concept. The study sample has 267 children represented in three groups: group of community children with normal weight ( $N = 147$ ), group of community overweight children ( $N = 89$ ) and a group of overweight children in treatment ( $N = 31$ ). The results from this study showed differences on quality of life, for the total scale and on the dimension of physical health and school health, in which overweight children in the clinical sample are the ones who presented more negative perception of physical health and school health, when compared with community children with normal weight vs community overweight children. For the rest of the dimensions of quality of life, no significant differences were found between the three groups. Regarding the self-concept on the group of children with a clinical diagnosis of obesity they perceived themselves as less competent relative to school competency, athletic competency, physical appearance, social acceptance, behavior and self-esteem. Regarding the variable depression this study suggests that community overweight children present more depressive symptomatology when compared with the other groups. No significant differences were found regarding anxiety symptomatology. To summarize, results from this empirical study demonstrated the importance of psychological variables when in the presence of obesity.

**Key words:** overweight; obesity; infancy; psychosocial variables.

### INTRODUCTION

Obesity is defined as excess weight, which results from an energy higher than what is spent<sup>1</sup>. Obesity is a complex health condition with social and psychological dimensions that can affect people of any age and socioeconomic group, both in developed and developing countries<sup>2</sup>.

A review of studies published recently in Portugal identified 21 studies on overweight and obesity in children and adolescents<sup>3</sup>. The prevalence of overweight ranged between 8.3% to 29.6% for males and 8.8% to 35% for females. Regarding the prevalence rates of obesity prevalence values ranged between 3.2% to 26% for males and 0.6% to 21.3% for females. In

Brazil the prevalence of overweight and obesity was 37.2% for males and 33.4% for females in children aged two to six years<sup>4</sup>.

In addition to the analysis of obesity and its prevalence in children, it is pertinent to note the major psychosocial factors that underlie the emergence, maintenance and development of it. We present some of the psychosocial factors reported in the literature as being associated with overweight in childhood and adolescence.

### Quality of life (QOL) and childhood obesity

In children and adolescents QOL is defined as the combination of objective and subjective well-being in different areas of life deemed relevant in their culture and time<sup>5</sup>. With regard to the specific

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areas of QOL dimensions seem consensual three dimensions, namely the physical, the psychological and social dimension<sup>6</sup>.

In a study of 4287 participants categorized as obese clinical and non-clinical obese there was no significant difference with regard to emotional, social and school functioning between groups<sup>7</sup>. Williams and colleagues<sup>8</sup> also attempted to relate the perception of quality of life of parents and children themselves and concluded that it was better in non-obese children than in children with overweight and obese children. In a recent review of literature<sup>9</sup> the authors identified an inverse relationship between body mass index and quality of life, including the physical and social functioning appears more compromised in children with overweight and obesity. In summary, research on quality of life in children with overweight and obesity shows that when compared with normal-weight children, children who are overweight have a poorer perception of their quality of life, especially at the level of physical functioning. However, according to Tsiros and colleagues<sup>9</sup> there are a number of limitations in the studies on quality of life and overweight, which make it difficult to generalize the results, namely (1) most studies are cross-sectional (2) few studies evaluate the differences between clinical samples and community samples (3) the different existing classifications of obesity, (4) the use of different measures to assess quality of life, and finally (5) the use of assessments among parents, which can lead to data unreliable.

### Self-concept and childhood obesity

The self-concept can be defined as the individual's perception about self in relation to their abilities, skills, social acceptance and physical appearance. Thus, the self-concept is an organized, hierarchical, developmental, evaluative and, crucially, multifaceted structure, covering various aspects such as academic, physical and social components<sup>10</sup>. In females, beyond self-esteem is based on physical appearance, there is also significant relationships with the shame aspect on the body, body dissatisfaction and the need to have a lean body<sup>11</sup>. In a study that compared obese children with non-obese children, it was found that obese children had lower values at the level of perception personal aspects such as physical appearance and athletic competence, that presented by children with normal weight<sup>12</sup>. Results from a study in Brazil<sup>13</sup> with pre-obese and obese patients found that the group of obese pre-adolescents had higher rates of body dissatisfaction and greater degree of food restriction than the non-obese group. Other studies found that there is no association between self-esteem and obesity in childhood<sup>14,15</sup>.

In sum, research on the relationship between obesity and self-concept is inconclusive. Some studies show the relationship between self-concept disturbance and obesity while others have shown

that obese children and overweight did not differ from normal weight children on self-concept.

### Psychological morbidity and childhood obesity

It has often been reported that obese individuals have quite often a number of different psychological problems like depression and anxiety<sup>17</sup>. During infancy the existence of childhood psychopathology tends to be higher among clinical populations of obese children and adolescents, and the major psychological consequences of obesity are low self-esteem, poor social interaction, depression and control disturbance<sup>18</sup>. Some authors report that at the level of psychological disorders, the most common is depression, and also the anxiety disorders<sup>19,20</sup>. A longitudinal study developed by Mustillo and colleagues with 991 children aged 9 to 16 years has shown that childhood obesity was not associated with problems of depression, with only the group with chronic obesity had psychiatric problems<sup>21</sup>. In turn, the results obtained in studies by Erickson, Robinson, and Killen and Farish Haydel and Dixon, Dixon and O'Brien revealed the existence of an association between depressive symptoms and obesity, mainly in girls with poor body image<sup>22,23</sup>.

Moreover, and contrary to the results obtained in previous studies, studies conducted with community samples of obese children found no statistically significant differences regarding the existence of depressive states in groups of obese children when compared to groups of children with normal weight<sup>24-26</sup>.

In summary, the results regarding the association between obesity and psychopathology or psychiatric problems are very inconsistent. A reasonable set of investigations is associated with depression as a potential consequence of obesity, although this relationship is modest and not always conclusive<sup>27-29</sup>.

Thus, this study aims to evaluate the differences in quality of life, psychological morbidity and self-concept among children with overweight and obesity.

## METHODS

### Participants

The study population consisted of 267 children, divided into three groups: the group (1) the community of children with normal weight (N = 147), group (2) the community of children who are overweight / obese (N = 89), group (3) children with overweight / obesity in medical treatment (N = 31).

Data on sex, age, body mass index and socioeconomic status are allocated in Table 1. The characterization of the family's socioeconomic status of children in the sample was based on information collected about the parents' profession and years of schooling. They were established as criteria for

**Table 1:** Socio-demographic characterization of the three groups studied in Braga, Portugal, 2009

	Total (n=267)	Community Sample		Clinical Sample
		Normal Weight (n=147)	Overweight (n=89)	(n=31)
		Mean (SD)		
Gender				
Male	106 (44.9)	61 (41.5)	45 (50.6)	19 (61.3)
Female	130 (55.1)	86 (58.5)	44 (49.4)	12 (38.7)
Socioeconomic status				
Medium-low	60 (29.7)	47 (44.3)	11 (15.1)	2 (8.7)
Medium	133 (65.8)	55 (51.9)	59 (80.8)	19 (82.6)
Medium high	9 (4.5)	4 (3.8)	3 (4.1)	2 (8.7)
BMI	20.0 (4.0)	17.2 (1.9)	22.7 (2.5)	24.5 (3.6)
Age	10.5 (1.5)	10.1 (1.5)	9.9 (1.2)	10.3 (1.8)

exclusion from the group of normal-weight children the existence of physical illness, and the group of children who are overweight/obese community the existence of other disease and medical treatment for obesity. The study was approved by the Ethics Committee of Hospital de Braga (Portugal) and the Director of the Northern School of the Ministry of Education of Portugal. Self concept is understood as the perception of the individual about himself, including the attitudes, feelings and self-knowledge which have up to their abilities, skills, social acceptance and physical appearance.

## MEASURES

### Socio-demographic questionnaire

The socio-demographic questionnaire was developed by the authors, taking into account the following socio-demographic variables: age, gender, grade, weight, height and occupation of parents.

### Self-Concept Scale by Susan Harter (1985)

The scale of self-concept of Children and Pre-teens<sup>30</sup> – Portuguese version<sup>10</sup> intended to measure how children perceive their competence in different areas of life, as well as evaluate their self-esteem. So this instrument is designed for a population for a population between 8 to 12 years old, consisting of six subscales (scholastic competence, social acceptance, physical appearance and behavioral attitude), in a total of 36 items. The Cronbach's alpha for the scale in this study is .88).

### CDI-Children's Depression Inventory

The CDI<sup>31</sup> – Portuguese version<sup>32</sup> is a self-report instrument consisting of 27 items for children and adolescents aged 7 to 17 years. This survey quantifies depressive symptoms in younger populations. Particularly the instrument allows quantifying the depressed mood, the ability to feel pleasure, vegetative functions, self-evaluation and interpersonal behaviors. The items are composed

of three sentences, and the subject must choose one that best reflects their functioning in the last two weeks. The Cronbach's alpha in this study for the depression scale is .80, i.e., it has good internal consistency.

### STAI - State Trait Anxiety Inventory for Children

The STAI<sup>33</sup> - Portuguese version<sup>32</sup> was developed to assess anxiety in two dimensions: state anxiety (STAIC c-1) and trait anxiety (STAIC c-2). In the present study has only been applied to C-2 level on the trait anxiety, because it is a far more stable level of anxiety in children. The trait anxiety scale consists of 20 statements that subjects often respond indicating how they feel on a scale of three levels: "never," "sometimes," "often". This scale was developed to measure individual differences in the relatively stable tendency to experience anxiety states. The Cronbach's alpha in this study for the anxiety scale is .77, which shows a good internal consistency.

### Paediatric Quality of Life Inventory - PedsQL from Varni

The inventory of generic quality of life<sup>34</sup> - Portuguese version<sup>35</sup> - is a modular form of assessment of quality of life related to health, for children and adolescents aged 2 to 18 years of age. Thus, the dimensions assessed by generic scales are physical functioning, emotional functioning, social functioning and functioning in school. The instructions suggest that a child at home think of these problems in terms of their occurrence during the previous month and responses are organized on a Likert scale with 5 options. The value of the items implies its reversal so that the higher results are better indicators of quality of life. The Cronbach's alpha in this study for the total QOL scale is .81, which shows a good internal consistency.

### Procedure

To enable the recruitment of children and pre-adolescents in the sample 1 and 2 (community

samples), the objectives of the research project were presented to the Executive Council in order to investigate the possibility of carrying out the sampling for the study. After being duly informed of all the implications of the protocol, request, and consent to the executive board, students and respective guardians were asked.

During the administration of questionnaires researchers emphasized the relevance of the following for both samples (1, 2): (1) voluntary participation of individuals, (2) that there is no right or wrong answers, (3) the incentive to not omit any response and (4) treatment of the data is anonymous and confidential. As the children ended up filling out the questionnaires, were asked to leave in order to be registered the weight and the height. The process of collecting the weight for the community samples was carried out in classrooms, with children assessed without shoes, standing, looking forward, positioned in the center of balance. Height was measured with the aid of a tape measure 2m, where students were asked to remain upright with feet and knees together. The data collected in clinical settings (clinical sample) was also observed informed consent and there is always careful to explain to each parent, the scope and nature of this investigation and that the completion of the questionnaires was voluntary and confidential realization of the anthropometric measurements and analysis of the remaining inclusion criteria were made in the nursing room. The study was approved by the Ethics Committee of Hospital de Braga (Portugal) and the Directorate of Education North (DREN) under the Ministry of Education (Portugal).

## Statistical Analysis

To make the data analysis was used SPSS 17. In the analysis of differences, we proceeded to study the differences between the variables, using the One-way ANOVA for the overall scales and the subscales used the MANOVA test. To identify the location of differences test was used post-hoc Gabriel because it is an appropriate test for when the groups do not have the same number of participants.

## RESULTS

### Quality of life

Statistically significant differences were found between groups in global quality of life ( $F(2.264) = 5.56, p = .004$ ). The Post Hoc Gabriel test revealed that children with excess weight of the medical group reported lower overall quality of life than children with normal weight ( $M = 72.82, SD = 6.10$  vs.  $M = 79.75, SD = 11.77, p = .002$ ) and than overweight children in the community ( $M = 72.82, SD = 6.10$  vs.  $M = 79.75, SD = 9.51, p = .005$ ).

It was noted that there are significant differences between groups in quality of life (Wilks'  $\lambda = .92, F(8.522) = 2.87, p = .004, \eta^2 = .04$ ). Table 2 shows the univariate results for the subscales of the PedsQL. From the analysis of the table we can see that there are significant differences in physical health subscale ( $F(2.264) = 8.76, p < .000$ ) and school health subscale ( $F(2.264) = 3.11, p = .046$ ). The results of Gabriel's

**Table 2:** Means and standard deviations of the dimensions of quality of life in the three groups studied in Braga, Portugal, 2009

Subscales	Community Sample		Clinical Sample (n=31)	F	p
	Normal Weight (n=147)	Overweight (n=89)			
		Mean (SD)			
Physical health	84.38 (15.91)	84.74 (12.00)	72.85 (14.86)	8.76	<0.001
Emotional Health	75.78 (15.76)	74.44 (17.06)	71.13 (11.08)	1.15	0.318
Social Health	84.95 (18.41)	82.72 (16.64)	79.44 (14.54)	1.44	0.240
School Health	74.01 (15.86)	76.69 (12.72)	69.19 (13.36)	3.11	0.046

post hoc test revealed that children of the medical group have lower levels of school health compared with children who are overweight in the community ( $p = .035$ ), and lower levels of physical health when compared to both comparison groups ( $p < .001$ ).

### Self-concept

Statistically significant differences were found between groups at the level of the variable total self-concept ( $F(2.260) = 16.99, p < .000$ ). The

results of Gabriel's post hoc test showed that the group of children in the clinical group has a more negative self-concept when compared with the normal weight group ( $M = 2.36, SD = .33$  vs.  $M = 2.78, SD = .37, p = .001$ ) and compared with the overweight group in treatment ( $M = 2.36, SD = .33$  vs.  $M = 2.72, SD = .36, p = .001$ ).

After the analysis performed, we found that there are significant differences between the three

**Table 3:** Means and standard deviations of the dimensions of self-concept in the three groups studied in Braga, Portugal, 2009

	Community Sample		Clinical Sample	<i>F</i>	<i>p</i>
	Normal Weight ( <i>n</i> =147)	Overweight ( <i>n</i> =89)	( <i>n</i> =31)		
		Mean (SD)			
Scholastic self-concept	2.61 (0.56)	2.62 (0.49)	2.33 (0.44)	3.88	0.022
Social self-concept	2.77 (0.45)	2.73 (0.45)	2.45 (0.47)	6.47	0.002
Physical self-concept	2.90 (0.57)	2.66 (0.57)	2.17 (0.42)	23.84	<0.001
Athletic self-concept	2.63 (0.48)	2.55 (0.49)	2.28 (0.40)	7.02	0.001
Behaviour self-concept	2.81 (0.54)	2.90 (0.62)	2.45 (0.53)	7.13	0.001
Self-esteem	2.94 (0.53)	2.87 (0.57)	2.37 (0.36)	15.34	<0.001

groups in terms of self-concept (Wilks'  $\lambda = .81$ ,  $F(12.518) = 4.87$ ,  $p < .000$ ,  $h^2 = .10$ ). The univariate tests (Table 3) revealed that there are significant differences in all dimensions of self-concept: school ( $F = 3.88$ ,  $p = .022$ ), social ( $F = 6.47$ ;  $p = .002$ ), physical ( $F = 23.84$ ,  $p < .000$ ), athletic ( $F = 7.02$ ,  $p = .001$ ), behavioral ( $F = 7.13$ ,  $p = .001$ ) and self-esteem ( $F = 15.34$ ,  $p < .000$ ). The results of post-hoc test revealed that children who are overweight have a school self-concept lower when compared with children with normal weight ( $p = .014$ ) and compared with the community group ( $p = .024$ ).

Similarly, children in the clinical group show lower values of social self-concept ( $p < .001$  and  $p = .007$  for the normal weight group and community group comparisons, respectively), athletic self-concept ( $p < .001$  and  $p = .014$  for the normal weight group and community group comparisons, respectively) of physical self-concept ( $p < .001$  for comparisons with both groups), behavioral self-concept ( $p = .003$  and  $p < .001$ , for the normal weight group and community group comparisons, respectively) and self-esteem ( $p < .001$  for comparisons with the two groups).

### Psychological morbidity

With regard to psychological morbidity we find that differences were marginally significant at the level of anxiety ( $F(2.264) = 2.72$ ,  $p = .068$ ), and for the depression were significant differences between groups ( $F(2.264) = 4.62$ ,  $p = .011$ ). The results of the Post-Hoc, show that

children with overweight reported more depressive symptoms compared with children with normal weight ( $p = .011$ ) and when compared with children who are overweight in the community ( $p = .007$ ).

### DISCUSSION

Concerning the quality of life, results suggest the existence of significant differences for the perception of physical health and school health between groups. These QOL dimensions perceived by children of the clinical sample are smaller compared to those of two comparison groups. Children in treatment reported that they had difficulties in running, low energy, and difficulty in performing any exercise. The results are in line with the study by Hughes and colleagues<sup>36</sup>, which compared the perceptions of obese and normal weight children and found that quality of life perceptions in the group of obese children were below in the physical health domain. Williams<sup>37</sup> also sought to relate the perception of quality of life of children and concluded that it was better in non-obese children than in children with overweight and obese children considered.

For the sub-scale school health, we can infer that as children of the medical group have a greater awareness about their excess weight, there may be contamination of its image which has influenced the perception of their competence at various levels, particularly at school level.

**Table 4:** Means and standard deviations of anxiety and depression scores in the three groups studied in Braga, Portugal, 2009

	Community Sample		Clinical Sample	<i>F</i>	<i>p</i>
	Normal Weight ( <i>n</i> =147)	Overweight ( <i>n</i> =89)	( <i>n</i> =31)		
		Mean (SD)			
Anxiety	32.34 (4.42)	32.81 (4.98)	30.13 (4.95)	2.72	0.068
Depression	10.78 (6.37)	10.10 (5.34)	12.74 (6.11)	4.62	0.011



Thus, compared with children and overweight/obesity in the community, children in the clinical group reported, for example, difficulty in being attentive in class, forgetting the content covered and have to miss school to go to the doctor.

For the self-concept, results from our study suggest the existence of significant differences in all dimensions of the self-concept (scholastic competence, athletic competence, physical appearance, social acceptance, behaviour and self-esteem) among the groups. Starting with the analysis of the results in the field of school self-concept, our results suggest that the group of children in the clinical group is perceived as less competent in the field school, compared with the other two groups. These data seem to be congruent with some studies that found that children with overweight and obese may be subject to stigmatization and discrimination by colleagues, and after that, show some difficulties in tasks of day-to-day, as for example, going to school, and perceptions of their scholastic competence and social acceptance very negative<sup>38</sup>. The results of this study also show that the clinical group of children with overweight / obesity are those that appear to show lower levels of self-esteem compared to children in the community and with normal weight children in the community who are overweight / obesity. There are several studies that seem to confirm the results obtained in this study, showing a general trend of children with elevated body mass indexes present a relatively poor self-esteem compared with children normal weighing<sup>39, 40</sup>. There is however no consensus in this area, and there are studies that clearly point to the non-differentiation of children with overweight/obesity in self-esteem<sup>41</sup>. For the domain of physical appearance, the results show once again that children with overweight / obesity treatment are those with a poorer physical self-concept. This result is consistent with studies showing that these children have high levels of dissatisfaction with their body image and their appearance<sup>41</sup>. The results obtained in the study of Malfará<sup>13</sup> with pre-obese and obese patients show that the group of pre-obese adolescents have higher rates of body dissatisfaction and greater degree of food restriction compared to the non-obese group.

Finally, there are the domains of self-concept related to athletic competence and behavior of children. The results indicated that the group of children with overweight / obesity in the clinical group are more dissatisfied with their athletic competence when compared with the other two groups of children. A study in Australia with obese and no obese children, verified the existence of values slightly lower on aspects such as physical appearance and athletic competence, that presented by children with normal weight<sup>42</sup>. Thus, leaving for a more integrated analysis on self-concept of children, it was found that the self-concept of children with overweight / obesity

treatment when compared with children in the community and with normal weight children community overweight/obesity seems to be more committed. Literature<sup>43</sup> in the same way suggests that overweight children, who were in treatment, had a more negative self-concept than the other groups.

With regard to psychological morbidity, the results show that children with overweight in treatment have more depressive symptoms. So there are several studies that corroborate the results obtained in this study showing that obese children have a significantly higher number of depressive symptoms compared to children of community<sup>22, 44</sup>. However, all these studies seem to have a common characteristic, which is the fact that the samples of obese children are clinical in nature.

Thus, one easily concludes that this type of population the probability of finding psychopathological symptoms secondary to a general physical condition is very high<sup>24</sup>. Some of the studies conducted with community samples, reveal, however, that there seems to be any association or there are very modest associations between depressive symptoms and child obesity<sup>24, 45</sup>.

For anxiety there were no differences between groups. This result was surprising in that the literature has shown that obese children present levels of anxiety higher than the rest and also have a greater number of types of manipulative behavior. Other studies have shown, however, that obese children do not have any differences with regard to symptoms of anxiety compared with no obese children<sup>45</sup>. We consider important to conduct similar studies to better clarify the relationship between anxiety and overweight in childhood.

Thus, children with overweight / obesity in treatment, in general have a lower level of psychological functioning compared to the two comparison groups. This may be due to greater awareness of these children for the fact that they have a health problem, since they have medical care. On the other hand, the treatment can be experienced as something negative, as in that there is an attempt to change a lifestyle, which often can provide feelings of failure and guilt when, for example, the objectives of change consumption patterns and increased physical activity are not achieved. Another possibility should also consider the fact that children who are overweight/obese may already have major consequences arising from the physical condition of their weight, and then present a greater psychological harm. The psychosocial implications assessed as not seem to come directly from the weight, but may arise associated with the treatment experience.

Thus, overweight children in treatment have a higher functioning commitment compared to normal weight and overweight children not in treatment. Thus, children with overweight / obesity treatment are those with a more negative perception of their physical and health education,

and have more depressive symptoms when compared with the other children. For the self-concept group of children with overweight / obesity

in the clinical group perceive as less competent in the school, athletic, physical appearance, social acceptance, behavior and self-esteem field.

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